

IN THE CLAIMS:

Claims 1, 4, 6, and 9 have been amended herein. All of the pending claims 1 through 10 are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended.

Listing of Claims:

1. (Currently Amended) A semiconductor assembly comprising:
a substrate having a plurality of circuits on a portion of a surface thereof;
a semiconductor die having a plurality of bond pads located on an active surface thereof and having a back side surface;
a plurality of solder balls connecting at least a portion of the plurality of bond pads of the semiconductor die to at least a portion of the plurality of circuits of the substrate;
one of a glob top material and a low viscosity polymeric material filling any space between the substrate and the semiconductor die;
a gel elastomer contacting at least a portion of the back side surface of the semiconductor die, the gel elastomer comprising a compliant gel or semi-solid adhesive filled with a thermally conductive material having surface wetting properties for heat transfer; and
a heat sink cap having a portion thereof contacting a portion of the substrate covering the gel elastomer, the semiconductor die, the plurality of solder balls, the substrate free of gaps therewith, the heat sink cap contacting at least a portion of the gel elastomer.

2. (Original) The semiconductor assembly of claim 1, wherein the heat sink cap includes a plurality of fins thereon.

3. (Original) The semiconductor assembly of claim 1, wherein the gel elastomer includes a cross-linked silicone.

4. (Currently Amended) A semiconductor assembly comprising:
a substrate having a surface having a plurality of circuits on a portion thereof;
a semiconductor die having a plurality of bond pads located on a first portion of an active surface thereof and having a back side surface;
a plurality of solder balls connecting at least a portion of the plurality of bond pads of the semiconductor die to at least a portion of the plurality of circuits of the substrate;
one of a glob top material and a low viscosity polymeric material filling any space between the substrate and the semiconductor die;
a gel elastomer contacting a portion of the back side surface of the semiconductor die, the gel elastomer comprising a cross-linked silicone gel filled with a thermally conductive material compliant under light pressure; and
a heat sink cap having the substrate and a portion of the gel elastomer, the heat sink cap covering the gel elastomer, the semiconductor die, the plurality of solder balls, and portion of the substrate free of any space therebetween.

5. (Original) The semiconductor assembly of claim 4, wherein the heat sink cap includes a plurality of fins thereon.

6. (Currently Amended) An assembly comprising:
a substrate having a plurality of circuits on a portion thereof;
a semiconductor die having a plurality of bond pads located thereon and having a back side surface;
a plurality of solder balls connecting at least a portion of the plurality of bond pads of the semiconductor die to at least a portion of the plurality of circuits of the substrate;
one of a glob top material and a low viscosity polymeric material filling any space between the substrate and the semiconductor die;
a compliant adhesive filled with a thermally conductive material gel elastomer contacting at least a portion of the back side surface of the semiconductor die; and
a heat sink cap having the substrate covering the compliant adhesive, a thermally conductive material gel elastomer including a cross-linked silicone gel, the semiconductor die, the

plurality of solder balls, a portion of the substrate having no space therebetween, the heat sink cap contacting at least a portion of the gel elastomer.

7. (Original) The semiconductor assembly of claim 6, wherein the heat sink cap includes a plurality of fins thereon.

8. (Previously Presented) The semiconductor assembly of claim 6, wherein the compliant, adhesive, and filled with a thermally conductive material, gel elastomer includes a cross-linked silicone.

9. (Currently Amended) An assembly comprising:
a substrate having a plurality of circuits on a portion thereof;
a semiconductor die having a plurality of bond pads and having a back side surface;
a plurality of solder balls connecting at least a portion of the plurality of bond pads of the semiconductor die to at least a portion of the plurality of circuits of the substrate;
one of a glob top material and a low viscosity polymeric material filling any space between the substrate and the semiconductor die;
a compliant adhesive filled with a thermally conductive material gel elastomer contacting a portion of the back side surface of the semiconductor die, and
a heat sink cap having the substrate and a portion of the compliant adhesive, a thermally conductive material gel elastomer having surface wetting properties and heat transfer properties compliant under light pressure, the heat sink cap covering the compliant adhesive, gel elastomer, the semiconductor die, the plurality of solder balls, and at least a portion of the substrate in contact therewith having no space therebetween.

10. (Original) The semiconductor assembly of claim 9, wherein the heat sink cap includes a plurality of fins thereon.